To the Castle! A comparison of two audio guides to enable public discovery of historical events

Elizabeth FitzGerald (corresponding author)

Institute of Educational Technology, The Open University, Walton Hall, Milton Keynes, MK7 6AA

Phone: +44 (0)1908 659866

Fax: +44 (0)1908 654173

Email: e.j.fitzgerald@open.ac.uk

Claire Taylor

Department of History, University of Nottingham, University Park, Nottingham, NG7 2RD

Michael Craven

MATCH, Tower Building, Faculty of Engineering, University of Nottingham, University Park, Nottingham, NG7 2RD

Abstract

This paper describes and compares two audio guides used to inform the general public about local historical events, specifically the 1831 Reform Riot as it happened in and around Nottingham in the UK. One audio guide consisted of a guided walk, organised and produced by a local community history group, where members of the group performed spoken narratives at specific points of interest around Nottingham city centre, delivered to a large group of participants. The other guide was a trail of geolocated audio files, created by the same community history group and delivered via location-aware smartphones to a smaller group of participants. This second guide provided similar historical information at the same points of interest as the guided walk, authored using a third party software app that employed a mapping facility to trigger audio events at specified locations. Our central research question was to examine how these experiences differed, or were similar; whether they provided an effective means of learning by the general public about local historical events; and how these kinds of techniques can be used in the future or by other community groups.

Keywords

Audio guide, location-based experience, mobile learning, experiment, history, public engagement

1. Introduction

This paper presents the findings from a study that investigated how geolocated audio could be used to provide opportunities for public learning of history. The project, utilising mobile media and informal learning, was a collaboration between academic and community-based historians interested in enhancing public understanding of selected aspects of the history of Nottingham. It was concerned with supporting the enhancement of historical literacy, historical 'empathy', and participants' abilities to

draw informed conclusions about contested historical subject matter. The historical subject matter was the 1831 Reform Riots in Nottingham, around which a local community history group designed a guided 'history walk'. The project supported a realisation of this walk and also gathered participant responses from both a 'people-led' walk and an alternative 'technology-led' version of the walk, where a media experience was delivered to participants through handheld devices that triggered the playing of audio files with information contained from different historical sources at specific locations of relevance to the Reform Riots around the city of Nottingham. Responses were recorded via a combination of methods: by questionnaires filled in immediately after each walk, researcher observations, and debriefing sessions of selected participants.

2. Using mobile audio for location-based experiences

Mobile media, and audio in particular, has been used in numerous location-based events and experiences, such as 'backseat playgrounds' [1] (a location-based story-telling game for children travelling on car journeys, that references common geographical objects) or 'I Seek The Nerves Under Your Skin' [2] (an adaptive poem, delivered through headphones, that tracks the motion of a listener. In order to hear the audio, the listener must start running, and constantly accelerate. If they slow, the audio will fade out.) Audio and mixed media are becoming more commonplace and more widely used than ever before, as a means of engaging with one's surroundings and that enables learning about nearby locations to take place.

However, the use of media technologies for accessing the past at specific geographical locations is not new in itself, and not even to the portrayal of riots. Reid *et al.* immersed users in Bristol in the experience of a riot that, like those in Nottingham, occurred in 1831 relating to rejection of the Second Reform Bill [3, 4]. The users moved around Queens Square, wearing headphones as part of an interactive 'play' and triggering sound files through the use of GPS (global positioning system); these included voices, burning buildings, looting, and a dragoon sabre-charge. The Bristol experiment focussed on the extent to which participants experienced the past as 'coming alive' through the use of technology, and was clearly successful in that sense. Users were asked three questions; (i) how much they enjoyed it, (ii) how much history came alive, and (iii) how immersed they felt. 563 people filled in questionnaires rating these three factors on a scale of 1-100. They scored on average 74.5, 73.7 and 73 respectively [4]. Most people undertook the tour alone, but a father and son did the tour together and spoke about how they had interacted, taking their headphones off and comparing notes at times. The sound was frequently cited as a factor in 'enjoyment' and in enabling immersion. The 'real' environment was cited as a visual distraction, however, for example: "*You can't get immersed in this because there weren't enough visual hooks. I was dominated by the visual scene and you had to almost shut your eyes to concentrate on the audio*" [4]. Several did in fact close their eyes. The 'random' nature of how the sound files were triggered raised the sort of issues that arise with hypertext: a non-linear structure which some users did not find helpful or enjoyable. The researchers noted that "*Many people felt that they wanted more of a background of the social and political context of the struggle"* [4]. They also noted that many people stopped in one place to listen to the audio and found listening and walking at the same time difficult. Some enjoyed 'strolling' and having their hands free. The Bristol study concluded on the nature of immersion as 'transient'. The user could not walk, look and be immersed in sound at the

same time. The immersion was most successful when a new 'sound' began and got their attention, in particular where it meant something to the user (it was an accent like theirs, referred to a place they knew or person they had heard of, for example). Silence, or a pause, also played an important part. Emotions, including fear, could also be invoked through the use of sound. However, too much going on at once was confusing to people and drew them out of immersion, interrupting the flow of the narrative. Particularly problematic was when users were at the 'region boundary' of two sounds, causing confusion and causing people to stop walking. 'Sign-posting' or other means would have helped people orientate themselves, to the extent that some users would have benefitted from a 'learning area' or tutorial, such as that which accompanies some computer games.

Epstein and Vergani put together a multimedia tour of a district in Venice to help the Tourist Board encourage visitors to explore lesser-known quarters of the city [5]. Their focus was cultural rather than historical and utilised technology specifically created for that project (including the use of thermachromic ink). However there are some correlations with our own research. For example, the user could choose a 'tour guide', one of three digital representations of real-life local characters, who 'walked' with you, appearing on the screen of your phone as well as talking to you, so that the user could personalise the experience to a degree. In a similar manner to our project, they too made use of the 'real' environment. Whilst they were guiding people through a historically preserved environment, which we were not, exact location was historically relevant and added to the experience. They had to pay close attention to binding the characters' stories into something coherent and '*create an intimate narrative experience that was neither banal nor too abstract for the average user*' and, as with the Riot! 1831 study [4], they were also concerned with narrative flow. Finally, they made use of 'closed, semi-private and commercial spaces' by negotiation with local people/businesses.

Reid describes location-based games in which the real world played a major role, in terms of unpredictable events, or coincidences [6]. The games utilised GPS, Bluetooth and other wireless media that enabled the players to perform specific tasks. One interesting feature, used in the 'Feeding Yoshi' game, was the notion of engaging in 'seamful' play, i.e. play that makes use of breaks or *seams* in the technological infrastructure, e.g. loss of GPS coverage or secure/insecure wireless points. In this situation, the designer's knowledge of the location being used and the seams present in the area of game play were central to the experience. In other examples of location-based games, the sound of lions roaring were heard in a school playing field (the 'Savannah' game), as children taking on the role of these lions learn how to hunt together successfully [also see e.g. 7]; in the 'Dubloon' mediascape game, players learned to associate characteristics of the imagined world and the real world as they move around in a physical space and 'trade' between 'islands' (specifically chosen physical places that the players themselves have created as part of the game) as they try to avoid virtual pirates.

Many of these studies have had the evaluation of the mediating technology as their focus rather than its appropriateness to learning about the past. In the Riot! 1831 user trial, the main contexts were the access, experience and enjoyment of historical 'events', as mechanisms for exploring the factors that facilitated and/or prevented total immersion. The paper published by Epstein and Vergani [5] reported exclusively on media within a media-rich historical market place, with no evaluation of the 'historical' component itself.

3. Case study – Hidden Histories: To the Castle!

Audio tours are becoming commonplace in many countries, particularly at tourist attractions such as stately homes or other historical venues. 'Hidden Histories: To the Castle!' was a pilot project, carried out under the 'Towards Pervasive Media' initiative (http://www.nottingham.ac.uk/cas/casresearch/towards-pervasive-media-outputs.aspx) to investigate the potential to use audio tours to enable public learning of history in authentic, physical locations. The project was a collaboration between academics from the University of Nottingham and a local community history group, 'People's Histreh' (http://peopleshistreh.wordpress.com). People's Histreh are a 'radical history' group, with members consisting of people with different political backgrounds, interested in what has been called 'history from below', 'grassroots history' or 'social history'.

The focus of this project was not merely on learning about and enjoying historic events, although this matters to the overall experience, but on the enhanced understanding of the past that comes from making meaning out of sources giving different and even conflicting perspectives. 'What happened' might not be as interesting a thing to discover as 'what it meant' to the people involved and to us. As such, it was important for us to develop a way of working that allowed members of People's Histreh not only to reconstruct for an audience what took place, but also to encounter primary historical sources relating to that place/event that reveal the competing 'meanings' given to the past by those describing, recording and interpreting it. The participants in the audio tours were invited to consider how and why the sources conflicted with or complemented each other, thus understanding the past as something constructed and contested, able to be interpreted from different points of view.

Encountering 'contested' sources in a location-specific sense has advantages for community-based historians in that the technologies available can provide interactive and fun experiences for the group's audience to engage with. For example, audiences could be guided by GPS to mystery locations and the past 'revealed' through the competing discourses present in the text. Even at a given 'place', the differing sources could be accessible only according to near-exact location (as determined by GPS or other location-awareness techniques), with competing 'viewpoints' sometimes being about physical as well as conceptual/ideological 'position': after all, there are two sides to a barricade!

People's Histreh wanted to create a guided walk for the general public, examining the Reform Riots of 1831 in Nottingham. Although the Reform Riots have already been used as the basis for previously-mentioned research by Reid *et al.*, it was by complete coincidence that this was also chosen as the main topic for this study, since People's Histreh had no prior knowledge of this research. Members of this community history group are very enthusiastic individuals who wanted to share their expertise and knowledge of the Reform Riots with people living in, or visiting Nottingham (who might otherwise be unaware of these events) whilst at the same time seeking to raise the local profile of their group and also engage in a recruitment drive. Guided walks provide an excellent way to provide location-specific content in an authentic context and in this instance, since the walk was being held in the city centre, it was very easy for participants to join, leave or return to the walk as they wished. One of the objectives of People's Histreh is to take an active role in organising events and producing materials, gathering together peoples' stories of past struggles and striving to integrate as much material as possible whilst also making it publicly accessible. This was to be their first guided walk event (although they have presented other guided walks since then).

The Nottingham 'Reform Riot' of October 1831, People's Histreh argue, was an uprising against the enemies of a parliamentary bill which would have moderately extended the electoral franchise (to men only) with properties generating income of £10 a year. In an e-book written by People's Histreh, they state that "*the history of Nottingham can be depicted as a long series of social struggles, which were often fuelled by the economic distress of the town's inhabitants*" [8]. Nottingham was the birthplace of Luddism, for example, and in 1766 experienced an early-modern 'food riot' known as the Great Cheese Riot. The 1831 riot was certainly triggered by the failure of the Second Reform Bill in the House of Lords earlier that year, but People's Histreh account for it within a much wider struggle against poverty; after all, the rioters were not the propertied people who would have benefitted from the 1831 extension of the franchise. Yet the Bill's collapse increased the hostility of the people of the city to its largest landowners including the Duke of Newcastle, holder of Nottingham Castle. Insensitive to the dire conditions in which most city dwellers lived and worked, he had noted in January that year that "*the people in this county generally are in full work and at good wages (2 shillings a day) at Nottingham, the trade has never been better*" [9]. As a leading opponent of electoral reform, his castle was the target of supposedly 'misguided rascals' who torched the castle during rioting and disorder that lasted for 3 days after news of the Bill's failure reached the city [10].

The 'Hidden Histories: To the Castle!' walk would be guided by two main questions:

- Who were the 'misguided rascals' who burned down Nottingham Castle in the 1831 Reform Riots, and
- Why did they do it?

These questions informed the core learning aims of the 'Hidden Histories' project. It consisted of several stages: planning the walks, carrying out the walks themselves and subsequent feedback and then the data analysis/interpretation phase. A planning meeting was held between members of People's Histreh and the project team from the University of Nottingham to discuss the route of the tour and the information and historical sources that could be presented at particular stopping points *en route*. During this planning meeting, volunteers came forward to offer to read out particular quotes or historical information from specific sources during the walk, from e.g. local newspapers; excerpts from military or police reports; local or national government publications. People's Histreh also approached Richard Gaunt, an authority on the Duke of Newcastle and member of the History department, and he agreed to play the Duke personally. This historical content used would be presented in both the 'people-led walk' and also in the 'technology-led walk'. The design of the questionnaires to enable participant feedback was also discussed, together with logistical matters such as physical organisation and direction of participants on the walks; accessibility for wheelchair users; how/where to advertise the walks; suggested dates/times of the walks and if permission would be needed (and from whom) in order to access any particular areas on the planned route. Expertise relating to the pragmatics of the technology-led walk (equipment, software etc.) was devolved to researchers from the University of Nottingham, since People's Histreh had limited familiarity and knowledge about how this might be achieved.

An 80-page printed booklet produced by People's Histreh was given out free to participants at the start of each walk, as a souvenir and to help provide publicity for the group. It is a detailed and independently researched document outlining the Reform Riot of 1831 and evaluating the sources through which it can be explored. It engages with the professional historiography of the city and the riot, using textual and graphical sources from the time period in which the riot took place. It includes historical maps and photographs/illustrations and a diverse range of bibliographic sources. Participants were

also given an A4 map of the route, a badge saying “To the Castle!” and small strips of material, to represent the scraps of wall hangings ripped from Nottingham Castle and other locations looted during the riots.

3.1 Guided walk – people-led

The first guided walk, directed and narrated by members of People’s Histreh and the University of Nottingham’s Department of History, was held in October 2010 and attracted over fifty participants (including children), mostly members of the general public and their families who had seen the walk advertised and had decided to attend. The meeting point was in the centre of Nottingham and was made clearly visible by the presence of a ‘loaf on a stick’: an actual loaf of bread, with black and red ribbons tied around it, pierced by a wooden stick and held aloft (Fig. 1).

Fig. 1 The ‘loaf on a stick’, a visual marker to show the meeting point for the ‘person-led’ guided walk. Badges given out to participants could be chosen from the ‘badge board’, also shown here.

Historically, the loaf-on-a-stick was a visual call-to-action to the labouring classes during the late eighteenth and early nineteenth centuries, used on occasion to incite violence and engage in riotous behaviour against the authorities [11]. Whilst it was clearly not used to this end in our study, it nonetheless provided a highly effective and authentic means of organising and directing participants in the guided walk – akin maybe to a large brightly-coloured open umbrella used by some commercial tour guides at sightseeing venues to manage large groups of tourists.

The walk consisted of eight ordered stops spread over a trail of just over a mile in length, starting in the city centre, heading in a circuitous route towards Nottingham Castle, before returning back to the city centre. The stopping points were linked to specific

events at or near those places, over a period of several days during the time of the riots, or to give an idea of what living conditions would have been like for those involved. For example, a narrow, dark and rather malodourous alley (Fig. 2) was used as one of the stop points, since it gave a very authentic perspective of what the housing conditions would have been like at the time of the riots, where 'back-to-back' houses were crowded into a small area with only cramped passageways running between or around them.

Fig. 2 One of the stopping points: a narrow dark malodourous alley, giving an authentic perspective on what living conditions were like at the time of the Reform Riots.
[Image used with permission, courtesy of Thom White, www.thomwhite.co.uk]

Another stop was at Nottingham Castle (Fig. 3), which was burned to the ground by the rioters and provided the backdrop for violent scuffles between the rioters and local law enforcement (both police and military). The tour ended outside the 'Galleries of Justice' museum, originally the site of Nottinghamshire's old Courthouse and County Gaol. At each stopping point, an introduction or overview was given by the main walk leader. Members of People's Histreh and Dr. Gaunt then read out the narrations relevant to that stop, with specific people taking responsibility for particular historic sources or personae throughout the length of the walk. The scripts had been planned and printed out in advance and narrators did not dress up in costume but rather were dressed in everyday casual clothes. The narrators tended to gather around the walk leader, so they could face the group to deliver their content and also enable smooth transitions between speakers. The delivery of the audio content was quite didactic and did not involve audience participation, although questions and answers were encouraged by the main walk leader. Despite this, walk participants did not ask questions in front of the group although a few were observed talking to members of People's Histreh and asking questions of them when walking between stops. The primary media sources were the

audio narratives, however participants (on both walks) were also given access to additional textual sources and photographs in the walk booklet.

After the walk finished, participants were asked to fill out a questionnaire asking for feedback about the walk and were also asked about what they learned on the walk; what they found interesting; who they empathised with or responded to most strongly (and why); how they reacted to the different historical sources; and also the experience as a whole, in terms of the style of presentation, the types of media used, the physical locations chosen and their relevance and how being part of a large group might have been different to being in a much smaller (e.g. family) group or experiencing the information as an individual.

Fig. 3 The people-led tour, outside Nottingham Castle

In addition to the questionnaires, a number of participants volunteered to attend a short debriefing session in a local café, where members of the project team were able to interview them further.

3.2 Guided walk – technology-led

The technology-led walk used the same route and stopping points as the people-led walk and participants were given the same booklet, A4 map, badge and scrap and material. The number of participants was much smaller, with six people taking part in total (with two researchers also present, taking the total number of people to eight). The walk took place in February 2011, with the same meeting point as for the people-led walk. The narrations for the walk, rather than being delivered live and in person by members of People's Histreh or the University of Nottingham, were instead provided to the participants as audio files delivered on a location-aware smartphone via a third-party mobile app. The app in question, 7scenes (http://7scenes.com) is a mobile

storytelling platform, that enables the placement of media on a map interface in a desktop authoring system, which can later be triggered on an internet-enabled smartphone when the user of the app is at a particular physical location (see Fig. 4).

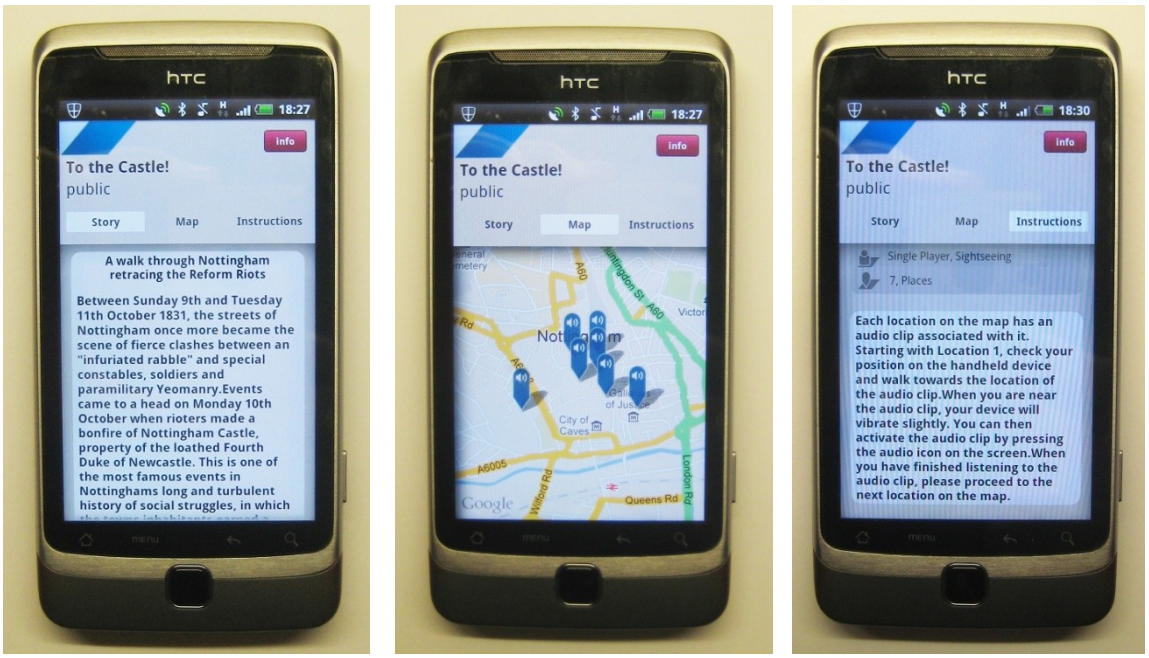

Fig. 4 7scenes app running on an Android smartphone (HTC Desire Z)

In this way, content that has specific locational relevance (including images, text, audio or video) can be delivered to users on their smartphone, when they are in key outdoor locations. It has a similar functionality to that of mediascape (mScape), a product that was created by HP Labs [12] and used in several related studies by other researchers. However, mScape is now defunct and only works on specific Windows Mobile devices; instead we wanted to use a more up-to-date architecture and so decided to use smartphones, which would also enable us to reach a wider range of potential end users.

Members of People's Histreh recorded several audio files and these were used to create the 7scenes "To the Castle!" audio tour. Each participant was provided with a smartphone and given a short briefing on how to use the device and what to expect. Participants could either use the provided headphones to listen to the audio files, or they could hold the phone up to their ear. The audio files gave directions to participants about the route and where the next stopping point was, although the group was guided/led by the main researcher, who took the place of the 'human' guide so that the main method of wayfinding was the same for both walks, but such that they did not provide any historical content. In addition, the 7scenes app provided haptic feedback (the phones vibrated briefly) when participants entered a 'trigger region' for the media, to provide additional reassurance or more specific direction that they were in the right place. Once participants were in a trigger region, they were able to play the associated audio by pressing a button on the screen of the smartphone. To provide back-up in case of the app crashing or GPS failing, the audio files were also loaded onto the smartphones as MP3 files, that could be played through the basic music player functionality of the phone (although this would obviously mean that they were not locationally-aware and participants would have to make more use of the paper map provided).

The participants all walked the route as a group and listened to the audio at each stopping point. At the end of the walk, they had a short debrief and interview session in a nearby café and were asked to fill in questionnaires, similar to those that had been used for the people-led walk, with an additional couple of questions to ask about experience of using the technology. Participant responses from questionnaires from both walks were tabulated in a spreadsheet and notes were taken by the research team during the debrief session and also the day after each walk. Audio data recorded at the time of the debriefing sessions were transcribed soon after. These data sources, along with written observations noted at the time of the walks by the research team, were then analysed qualitatively to find supporting evidence for each of the themes mentioned below.

4. Comparison of the guided walks

Using data obtained from the follow-up questionnaires (N=10 from the people-led walk; N=6 from the technology-led walk) and debriefing sessions (N=5 from the people-led walk; N=6 from the technology-led walk), this section now focuses on the comparisons made between the two different walks. We draw upon differences/similarities of the walks and also issues surrounding participant engagement and interaction, categorised under several sub-headings.

4.1 Mode of delivery

The audio narratives in the people-led walk were delivered live and in person by volunteers from People's Histreh and the University of Nottingham using prepared scripts. The content, derived from a mix of historical sources including newspapers, government reports and documented eye-witness accounts, had been decided in the planning meeting but the assignation of the content to each volunteer was done in a mostly random, *ad hoc* manner. At each stopping point *en route*, once the group of participants had gathered around the walk leaders, an overview was first given by one of the walk leaders (this was always the same person) and then the other narrators took it in turn to read out their pieces.

The content was mirrored in the technology-led walk, where an introduction was provided by the same person at each stop, followed by a spoken narrative recorded by one or more members of People's Histreh using the same scripts as before.

The clear difference is the fact that one audio narrative was delivered live and across an open physical space, to a large number of people, whilst the other was recorded prior to the event and delivered on an individual basis to each participant via headphones or by listening to the phone's in-built speaker. Participants in the people-led walk found that it was sometimes difficult to hear, due to the numbers attending and their own relative position to the speaker or how loudly/quietly they spoke, also how many other people stood in front of them and additionally depending on what background noise was in the area. For example, in busier parts of the city centre, there was noise from traffic and the passers-by; also from the local street-cleaning vehicles, one of which almost appeared to follow the group around and made it a somewhat frustrating experience at times. This was somewhat mitigated with the technology-led experience although much noise pollution was still apparent and participants were observed sometimes holding their hands over the headphones in their ears, to try and block out additional ambient noise. In addition, sometimes these participants felt the need to close their eyes, in order to concentrate on what was being said; when asked why they did this, the response was

that the visual scene in front of them was distracting (also found in the Bristol study [3]) and they found they weren't listening properly to the audio narrative, sometimes having to play it back again if they felt they had missed something. The ability to re-play the audio was an obvious advantage that people on the other walk did not have.

It was also interesting to see how the participants listened and reacted to the narratives. In the people-led walk, participants listened as a group and so all of them heard the same narrative at the same time; this afforded the opportunity to discuss the narrative with the person stood next to them or even to ask a question of the speaker (although none did and in fact one respondent stated that they felt questions were not encouraged). In the technology-led walk, participants were not necessarily listening to the audio narratives at the same time as each other and so if they wanted to discuss the content, they had to wait until their discussant had finished listening to the audio clip. On occasion, one or two of the participants felt as though they were 'getting behind' of the others and felt guilty for keeping them waiting, so stopped listening to the audio before it had finished. This may have been partially due to the inclement weather conditions at the time of the walk (discussed in more detail later); certainly the low environmental temperature was not especially conducive to lingering at each location on the walk.

Participants from both walks enjoyed having additional media to refer to (the A4 map and booklet with textual accounts and historical images/maps). In addition, some responses from both walks suggested the addition of non-spoken/ambient audio, to encompass e.g. songs or folk music; the sound of the crowd/mob itself; children playing or dogs barking; fire crackling – particularly at the Nottingham Castle stopping point; water dripping etc. It was felt that these types of ambient sound, used appropriately, would help instil greater authenticity and provide an atmospheric backdrop to the walks.

4.2 Number of participants and social interactions

The number of participants on the two walks varied quite widely, due to cost issues in providing a large number of GPS-enabled smartphones for the technology-led walk. Over fifty people took part in the people-led walk compared to six in the technology-led walk. However, for the purposes of this study, we felt that we could still assess the two walks as being 'group experiences', but ones that varied in the sizes of each group.

The large number of participants on the people-led walk and the 'live', interactive mode of delivery fostered a sense of community, so that complete strangers felt comfortable talking to each other about what they had heard, or could relate it to their own knowledge or experiences. The problem with ambient noise has already been referred to, particularly the street-sweeping vehicles. The frustration felt by a number of participants, at the continued noise pollution provided by one of these vehicles, motivated one of the participants to incite the group to attack the vehicle and thus disable it. This jocular sentiment was clearly inspired by the feeling of power that resulted from being in a large group and from the narrators referring to 'the mob' and 'the rioters' that were prevalent in the subject matter. In this manner, the sensation of being in a large group whilst listening to historical information about the actions of another large group meant that there was an air of authenticity that could be difficult to replicate with smaller numbers of participants.

Another interesting phenomenon resulted from the way in which the audio was encountered. The researchers felt that both walks would be a group experience, even

allowing for the difference in numbers. However, by providing participants in the technology-led walk with individual devices and headphones, they tended to experience the spoken audio in isolation from other participants, turning the group experience into more of a solitary one. This finding has also been reported by researchers on the 'Sotto Voce' project, who attempted to address this by providing shared audio via an 'eavesdropping' mechanism [13].

One issue arose from the technology-led walk that was not apparent in the people-led walk. Variability in GPS hardware in the smartphones (3 different models were used) meant that one of the participants experienced a slightly different trigger region when using the 7scenes app and so often ended up listening to the audio narrations approximately 8-10 metres away from other members of the group, standing on her own. This made the experience even less conducive to social interaction and more of an individual event. With the people-led walk, location-awareness and the correct place to stop was through the direction of the walk leaders and a coarser degree of locational ambiguity could be allowed for than with GPS, in that the narrators were already present in the group and could deliver their speeches wherever the group happened to stop (whilst obviously in keeping with the pre-planned route and stop points).

Other issues raised by several participants in the technology-led walk included the feeling of 'protection' that a group environment elicited, whilst another cited a fear of being mugged for their 'high-tech' device, which would have been more of a concern if they were doing the walk as an individual.

4.3 Geographical affordances/locations and places

Respondents from both walks enjoyed the authentic setting in which the walks were located and the stopping points were felt to be very appropriate in terms of the historical content that was delivered there; participants stated that they felt more of a sense of the occasion and could picture events more clearly than if they had been learning about the events in e.g. a public lecture or from reading a book etc. This is also consistent with findings by Reid *et al.* [14], that appropriately-chosen outdoor environments are better for authenticity than learning in e.g. a classroom. Aspects of the locale that helped inspire this authenticity included visiting key buildings and looking at aspects of their architecture; streets and their layout (particularly in relation to the historical maps provided); smells; and the location of one stopping point in relation to another, in terms of the narrative and how it traced the route taken by 'the mob' who took part in the Reform Riots.

Some respondents felt that they would have liked to know a bit more about some of the localities *en route* between formal stopping points whilst others suggested that a route/stopping points that were less busy in terms of numbers of other people/passers-by would provide fewer distractions and enable greater engagement with the audio narratives.

4.4 User experience

An important difference between the two walks was the weather conditions that were present at the time. The people-led walk happened on a balmy October day, with bright sunshine – a day when people would be quite comfortable spending 2-3 hours walking around Nottingham city centre. By stark comparison, the technology-led walk took place on a bitterly cold day in February, with occasional sleet/rain, that necessitated warm outdoor clothing and an umbrella. This meant that, from merely a practical point of view, the technology-led walk provided additional difficulties or levels of discomfort that

participants in the other walk did not encounter, e.g. trying to use a smartphone whilst wearing gloves; having to carry the smartphone in a pocket or plastic bag to prevent it getting wet; trying to manage/physically manipulate several handheld objects at once (smartphone, personal belongings/handbag; A4 map/booklet and an umbrella). These difficulties added to the other distractions inherent in a public place and inhibited seamless listening of the audio materials.

There were also some interesting findings from the technology-led walk, particularly with the issue of authenticity: for example, one of the narrators of the digital audio clips had a foreign accent, which participants felt was not appropriate since they would have preferred a regional accent so they felt more immersed in the local surroundings. Despite the same narrator having been used on the person-led walk, this had not been picked up as an issue by those participants. Another respondent stated that they should have used the appropriate gender e.g. an eye-witness report from a male subject should have been recorded by a man rather than a woman. There also seemed to be issues with the perceived quality of the recordings; one participant stated her dislike of the 'reading voices' and that one in particular sounded rather bored. This highlights a tension between the obvious knowledge, interest and enthusiasm shown by members of People's Histreh and the way in which they are able to convey this historical content in an engaging manner to others (particularly the general public) using non-spontaneous audio recordings. One of the comments from the technology-led walk respondents suggested that the audio recordings should also be available as different versions, to accommodate differences in their target demographic e.g. children vs. adults; native English speakers vs. non-native speakers; those possessing some knowledge of the Reform Riots already vs. those with no prior knowledge. The respondents from the people-led walk did not mention any of these issues, but instead commented on the clarity and authority of the main speaker; the good diversity of the voices used; and the excellent style of presentation. It is possible that there is some bias present however, since many of those attending the people-led walk already had some prior association with People's Histreh or were personal friends with some of the members, so might be expected to be broadly supportive of their efforts and want to give positive feedback and encouragement. None of the participants on the technology-led walk had any affiliation with People's Histreh and so might have been more objective in their responses. There is also the way in which the spoken narratives, delivered in location and in front of a large, live audience, might have lost something in the retelling through recorded audio, even if the end product resulted in a clearer listening experience.

4.5 Opportunities for learning

Both types of walk resulted in public learning of historical facts about the Reform Riots in Nottingham and many of the respondents also showed evidence of historical empathy, particularly female respondents to the role of the women in the riots. There was also some degree of participants making informed conclusions about the contested historical subject matter, although most seemed to show sympathy with the rioters and tended to trust the personal accounts of the working class more than the 'official' sources. At the very least, participants were made aware of the nature of these conflicting sources of information by the narrators, who went to great lengths to point out the limitations of the evidence presented, as well as any potential bias or contradictions therein.

One participant from the technology-led walk mentioned that there didn't seem much analysis of the historical sources, that they were merely descriptive and that she found this rather mundane. However, one of the objectives of the walk was to encourage

participants to analyse the evidence themselves and draw their own conclusions, but this was maybe not made clear at the start of the walk. It also highlights a mismatch between what the participants' expectations might have been, compared to those from People's Histreh – and again, makes specific assumptions about the purpose of the walk that might not be in line with what a 'target' end user might wish to engage with.

4.6 Other factors

Several other issues have been highlighted by this study, mostly arising from the technology-led walk. As with some related studies, there were a few technical problems experienced. One of the smartphones we intended to use for the project did not support the 7scenes app; this was due to the app not working on certain screen resolutions (a common problem with Android phones and app development/availability). On another smartphone, there was a temporary GPS failure at the start of the technology-led walk and the participant's location was carried out through Wi-Fi triangulation, which is relatively coarse-grained and was insufficient for the app to work. In this instance, we resorted to the back-up plan, where the participant listened to the audio narratives in mp3 format using the music player functionality of the phone and with the paper map as their primary navigational/directional aid.

There were also some problems with the audio content itself. Some participants on the technology-led tour complained about the length of the narratives, saying that they were too long. Most of the audio files were around 5-6 minutes in length, with a couple around 7-7.5 minutes long. It was considered that these audio clips were too long for someone to stand still in one place and listen to. However, the weather conditions present at the time of each walk cannot be disregarded and it is likely that participants on the people-led walk were content to listen to these 'lengthy' narratives whilst enjoying a temperate, sunny climate – whilst the participants on the other walk, experiencing cold and damp conditions, were not. (That said, direct observation and *ad hoc* conversations with some of the participants from the people-led walk suggest that some did find the narrations overly long, although none of the questionnaire respondents mentioned this explicitly.) The makers of another audio storytelling smartphone app with similar functionality (Broadcastr, www.broadcastr.com) actually restrict the size of the audio file that can be uploaded, that results in a spoken audio clip of around 3-4 minutes long. This was a conscious design decision, based on their belief that this is the maximum amount of time that someone wants to listen to an audio clip whilst in one physical location (personal communication). Respondents from the technology-led walk also considered the content of the audio clips to be rather dry, academic and tried to fit in too much material and thought that, in places, they assumed a certain amount of background knowledge that some people would not possess, e.g. the 'back story' to the Reform Riots and the Reform Act itself, or a working knowledge of related historical events. Also, on a couple of occasions, the narrator made a somewhat subjective and disparaging comment that annoyed them e.g. the commercialisation of a fictitious figure (referring to the character 'Robin Hood'); the role of community police officers and other modern, uniform-wearing 'authority figures'. The reason for the annoyance was that the participants wanted the historical sources presented to them objectively and did not want to hear what they considered to be personal jibes included in this subject matter. These 'asides' were also made during the people-led walk, but researcher observations state that the participants of that walk tended to react more sympathetically during those instances, so this was more of an issue for the technology-led walk. However, it must be considered that the narrator, in making these comments, somehow interrupted the 'performance' aspect of the walk, as well as the conveying of

objective facts, that would have led to an effect in the immersion or enjoyment of the experience. It is also important to note that this 'performance' aspect would have been different between the two different walks, where the two types of narration in the person-led walk (story-telling and reading of historical sources) were combined in the audio files of the technology-led walk, hence this may have had an impact on how participants reacted to the narrators and the way in which they engaged with the content.

Participants on the technology-led walk also mentioned that they would have liked the opportunity to ask questions throughout the walk, although this was not possible due to the mode of delivery. Some comments were also made about the nature of the device: they would have preferred bigger buttons and the ability to rewind more easily (this was done via a slider bar); they were also rather wary of using a new (for them) 'high tech' smartphone and suggested a version that worked on more basic phones should also be offered (this view may of course change as the use of smartphones becomes more prevalent). However, they liked the idea that the tour could normally be done at a time that suited them, and that they wouldn't have to wait for an 'organised tour' led by a tour guide to start at a time that might not be convenient for them.

5. Findings and lessons learned

This study has demonstrated how public learning of historical events can be enacted through two types of audio tour: one that was directed and narrated *in situ* by members of a local community history group, and one that provided directions and narrations through the use of a location-aware mobile storytelling app on a smartphone.

It is clear that there are benefits and drawbacks to both kind of tour. In both situations, participants enjoyed being part of a group, although it was clear that the people-led tour offered opportunities for social interaction that the technology-led tour did not. However, with the people-led tour, it was sometimes difficult to hear all the narrators and it was impossible to 'play back' the narration in the way that the participants on the other tour could.

Authenticity and being able to relate the historical content to real locations was seen as a major advantage to learning about the subject matter, compared to other forms of learning e.g. from reading a book or in a formal classroom/lecture scenario. Participants stated that it gave them 'a sense of occasion' and enabled them to use their imagination to reconstruct the events of the time.

The weather at the time of the two walks was very different and this had a clear impact on the enjoyment of the walk by the participants. However, it does highlight the potential of the technology-led tour to be used at a time that suits the user, so that (under normal circumstances) they would not have to go on the tour unless the weather conditions were satisfactory for them.

Participants had a mixed response to the mention of other locations that were some miles away. For example, there was mention of Colwick Hall, some distance to the east of Nottingham, and also the lace mill in Beeston, a few miles to the west of Nottingham. Some participants liked discovering the wide geographical extent of the riots, whilst others could not see the relevance of including this information and wanted only to know what was happening in the city centre itself. This is an important issue: if learning is situated in a particular location, then there can be a problem when referring to other

places, especially without bringing them in authentically (e.g. a 'messenger' could arrive from a nearby location with some news of that area). However, it also depends on the granularity of what counts as 'local'. For example, in many museums, even 'local' objects may have been gathered from some miles away. The fact that this was a mixed response suggests that there may be no right answer – some people might like to see how local events connected to wider-reaching/national events whilst others want just the precise 'here and now'. It might also depend on whether those listening to the audio commentary are local inhabitants, who already know the area quite well and might like to know how events spread more widely, or if they are tourists or people new to the region, for whom too much information about unfamiliar areas would be off-putting. However, this is potentially an example of how 'seamful content' might be used to provide breaks in the immersion or to make people aware of how historical events affect other people from a broader geographical area.

There also seemed to be some issues regarding the content that were highlighted by the participants from the technology-led tour. It seems that shorter audio clips would have been preferred and that the way in which the content was delivered could have been less dry. We think this may be a difficulty often encountered by enthusiasts, where they find it difficult to 'step back' from their subject matter and try to see how it might be perceived by someone completely new to the subject – or in fact, how to draw someone in who might not otherwise be that interested. One possibility might be to provide a brief overview, followed by the option to hear more detail if the user requests it. This technique was used in the CAGE study, carried out in an art gallery, although user interest (and subsequent provision of more detailed information) was inferred implicitly by the length of time the user spent at one location before moving on [15]. It is also possible to provide different audio tours geared towards different target end users e.g. children/adults; families/couples/individuals; non-native English speakers; tourists/local inhabitants. In this case, it is more scalable to produce the tour using the technology-led approach, rather that run separate people-led walks.
It also seems clear that, whilst the technology already exists to support this kind of tour, it is not without its problems and it is highly recommended to have a 'back-up plan', as we did, in case of sensor failure. However, despite this, we have shown that it is possible to provide an alternative means of experiencing an audio tour that is enacted through a smartphone and created via a simple authoring tool that requires minimal training.

We hope to run more technology-led tours in the future, in conjunction with People's Histreh, using the findings from this study to provide a more engaging user experience. We are also looking at how user-generated content could be used to supplement existing historical content, or to provide opportunities for a dialogue between members of People's Histreh and those who participate in the technology-led tours. We hope that this work has provided insights into how a community history group can engage with the general public to foster informal learning opportunities about local history and also given some inspiration for other community groups to get involved in similar projects.

Acknowledgments

Our thanks go to Russell Beale for providing feedback on earlier drafts of this paper, also to Robert Jones and Faye Taylor for assisting with the study, and to our friends in People's Histreh. Lastly, we are enormously grateful to all those who participated in the walks, particularly those who staunchly suffered the cold and wet weather!
POST-PRINT ADDENDUM: The 'Towards Pervasive Media' initiative was funded by EPSRC, grant number EP/H024867/1.

References

1. Bichard J, Brunnberg L, Combetto M, Gustafsson A, Juhlin O (2006) Backseat playgrounds: pervasive storytelling in vast location based games. In: Harper R, Rauterberg M, Combetto M (eds) Proceedings of the 5th International Conference on Entertainment Computing (ICEC'06), Cambridge, UK, 2006. Springer-Verlag, Berlin, Heidelberg, pp 117-122. doi:10.1007/11872320_14 http://dx.doi.org/10.1007/11872320_14
2. Marshall J (2009) I seek the nerves under your skin. In: Proceedings of the Seventh ACM Conference on Creativity and Cognition (C&C '09) Berkeley, USA, 2009. vol 27-30 October 2009. ACM Press, pp 477-478. doi:10.1145/1640233.1640364.
3. Reid J, Hull R, Cater K, Clayton B (2005) Riot! 1831: The design of a location based audio drama. In: Proceedings of the 3rd Uk-UbiNet Workshop, University of Bath, UK, 2005. vol 9-11 February 2005. pp 1-2
4. Reid J, Geelhoed E, Hull R, Cater K, Clayton B (2005) Parallel worlds: immersion in location-based experiences. In: van der Veer GC, Gale C (eds) Proceedings of CHI '05: Extended Abstracts on Human factors in Computing Systems (CHI '05), Portland, Oregon, USA, 2005. vol 2-7 April 2005 ACM, New York, NY, USA, pp 1733-1736. doi:10.1145/1056808.1057009 http://doi.acm.org/10.1145/1056808.1057009
5. Epstein M, Vergani S (2006) History Unwired: Mobile Narrative in Historic Cities. In: Proceedings of the Working Conference on Advanced Visual Interfaces (AVI '06), Venezia, Italy, 2006. vol 23-26 May 2006. ACM, pp 302-305. doi:http://doi.acm.org/10.1145/1133265.1133327
6. Reid J (2008) Design for coincidence: incorporating real world artifacts in location based games. In: Tsekeridou S, Cheok AD, Giannakis K, Karigiannis J (eds) Proceedings of the 3rd International Conference on Digital Interactive Media in Entertainment and Arts (DIMEA '08), Athens, Greece, 2008. vol 10-12 September 2008. ACM, New York, NY, USA, pp 18-25. doi:10.1145/1413634.1413643 http://doi.acm.org/10.1145/1413634.1413643
7. Benford S, Rowland D, Flintham M, Drozd A, Hull R, Reid J, Morrison J, Facer K (2005) Life on the edge: supporting collaboration in location-based experiences. In: Veer GCvd, Gale C (eds) Proceedings of the SIGCHI conference on Human factors in computing systems (CHI '05), Portland, Oregon, USA, 2005. vol 2-7 April 2005 ACM, New York, NY, USA, pp 721-730. doi:10.1145/1054972.1055072 http://doi.acm.org/10.1145/1054972.1055072
8. Yarnspinner V (2011) To the Castle; Nottingham's Crowds in the Reform Riots. Loaf on a Stick Press, Nottingham, UK
9. Gaunt R (ed) (2003) Unhappy Reactionary: the Diaries of the Fourth Duke of Newcastle-Under-Lume, 1822-50. Thoroton Society, Nottingham
10. Beckett J (2005) The Nottingham Reform Bill Riots of 1831. In: Jones C, Salmon P, Davis RW (eds) Partisan Politics, Principles and Reform in Parliament and the Constituencies, 1689-1880: Essays in Memory of John A. Phillips Edinburgh University Press, Edinburgh, UK
11. People's Histreh (2010) A loaf on a stick? http://peopleshistreh.files.wordpress.com/2010/11/mayday2010_flyer_loafonastick.pdf. Accessed 20 November 2011
12. Stenton SP, Hull R, Goddi PM, Reid JE, Clayton BJ, Melamed TJ, Wee S (2007) Mediascapes: Context-Aware Multimedia Experiences. IEEE Multimedia 14 (3):98-105
13. Aoki PM, Grinter RE, Hurst A, Szymanski MH, Thornton JD, Woodruff A (2002) Sotto voce: exploring the interplay of conversation and mobile audio spaces. In: Proceedings of Proceedings of the SIGCHI conference on Human factors in Computing Systems (CHI '02), Minneapolis, Minnesota, USA, 2002. vol 20-25 April 2002 pp 431-438. doi:http://doi.acm.org/10.1145/503376.503454
14. Reid J, Hull R, Clayton B, Melamed T, Stenton P (2011) A research methodology for evaluating location aware experiences. Personal and Ubiquitous Computing 15 (1):53-60. doi:10.1007/s00779-010-0308-6
15. Rudman PD, Sharples M, Vavoula GN, Lonsdale P, Meek J (2008) Cross-context learning. In: Tallon L, Walker K (eds) Digital Technologies and the Museum Experience: Handheld Guides and Other Media. Alta Mira Press, Lanham, MD pp 147-166